

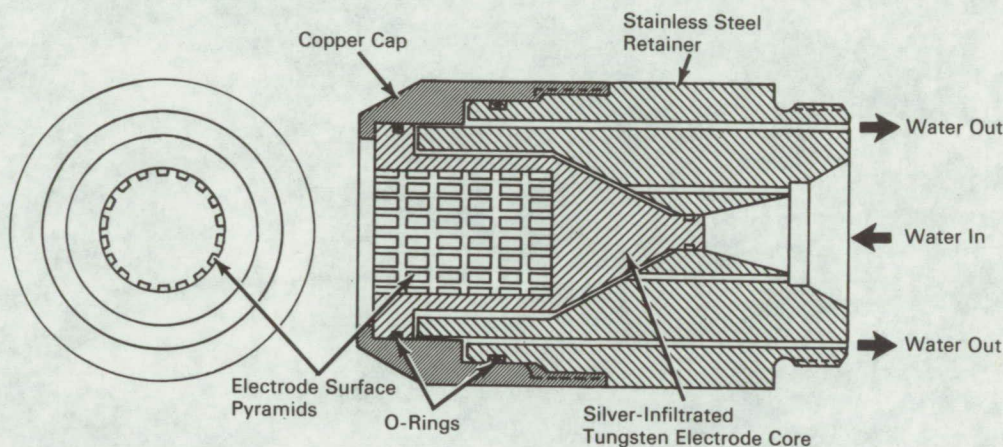


# AEC-NASA TECH BRIEF



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## Plasma Jet Electrode Has Longer Operating Life



### The problem:

Pure tungsten electrodes (cathodes) used in plasma jet generators have an average operating life of only 15 minutes at the extremely high heat fluxes and arc temperatures encountered.

### The solution:

A water-cooled, silver-infiltrated tungsten electrode which has twice the lifetime of the pure tungsten electrode.

### How it's done:

The assembly consists of the silver-infiltrated tungsten electrode core, a stainless steel retainer, and an O-ring sealed copper cap which holds the electrode core in the retainer. Annular passages are provided for water circulation to cool the electrode and thereby reduce the erosion rate. The high heat conductivity of the silver-infiltrated tungsten core ensures excellent heat transfer from the arc to the coolant. Pyramids on the surface of the electrode core reduce thermal stresses by concentrating the arc electrical energy on a small contact area.

### Notes:

1. Replacement costs for this electrode are considerably below those of previous devices.
2. Inquiries concerning this invention may be directed to:

Technology Utilization Officer  
AEC-NASA Space Nuclear Propulsion Office  
U.S. Atomic Energy Commission  
Washington, D.C. 20545  
Reference: B67-10024

### Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

Source: Charles M. Gracey  
of Aerojet General Corp.  
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Category 02